Description

Screen Printing Machine

The invention relates to a screen printing machine having a gripper mechanism assigned to the print table for conveying the print material into and out of the machine.

Screen printing machines of this type are known. They are usually equipped with a peripheral gripper system and may be designed as single-color or multicolor printing machines. The print material is conveyed by the grippers from one side into the machine, where it is printed and conveyed back out again on the other side. In doing so, the back side of the print material slides over support plates and over the print table and dryer table. This can result in damage, e.g., in the form of scratches on the back surface, which can result in considerable quality deficiencies in the case of transparent materials or materials already printed on the back side.

It is already known that the surface of the print table over which the material slides may be coated or it is also possible to work with blowing air support in the area of the print table, to achieve an improvement here. However, it has been found that the problem defined above can be solved only inadequately by this method.

Therefore the object of the present invention is to design a screen printing machine of the type defined in the preamble so that damage to the back side of the print material is prevented.

To achieve this object, it is proposed that with a screen printing machine of the type defined in the preamble, a flexible and flat carrier on which the print material rests is connected to the gripper mechanism.

The print material to be conveyed continuously lies on the carrier in this way in conveyance through the screen printing machine and does not come in direct contact with either the support plates or the print and drying table. Damage to the back side is therefore completely prevented.

In an embodiment of this invention, the carrier is designed to be air permeable so that the print material can be secured by the vacuum through the carrier usually applied to the print table throughout the printing operation on the print table.

In another embodiment the carrier is designed with an antistatic finish to prevent a static charge buildup during conveyance and movement over the print table. In another embodiment, the carrier is also designed to be wear-resistant so that its lifetime is long enough.

In one embodiment of this invention, the carrier may be designed to be UV-resistant and have thermal stability. Industrial cloth of any type having these properties is suitable for this intended purpose.

In a particularly advantageous embodiment of this invention, the gripper mechanism may have a pair of grippers driven by conveyor chains with the carrier held between them. The carrier is expediently connected to at least one gripper by an elastic intermediate piece capable of equalizing changes in distance between the grippers that occur during the conveyance operation.

This invention is illustrated in the drawing on the basis of an exemplary embodiment and described below.

FIG 1 shows a schematic side view of a screen printing machine according to this invention and

FIG 2 shows a schematic perspective partial view of the gripper system of the machine according to FIG 1.

FIG 1 shows a machine frame 1 of a screen printing machine with a print table 3 arranged below the squeegee mechanism 2, equipped with perforations 4 on its topside, as indicated schematically in FIG 2 so that a vacuum applied to the print table can act through the perforations to hold flat print material 10 tightly on the print table during the printing operation.

In a known technology, the squeegee mechanism 2 consists of carriers 5 supported laterally above the print table, each carrier on the sides facing the other, equipped with guide rails to guide a squeegee blade 6 and a preliminary squeegee blade situated upstream in the direction of movement; each preliminary squeegee blade is mounted at both ends on a crossbeam 9 which can be moved back and forth within the carrier 5 of the squeegee mechanism and can be raised and lowered via print cylinders 7 and 8, not shown in greater detail here.

The print material 10 to be printed is gripped by a gripper from the left side with the screen printing machine shown here and fed in at the

right beneath the squeegee mechanism 2 and above the print table 3. The gripper 11 is in the position beneath the squeegee mechanism 2 and on the right end of the print table 3 so that the print material 10 comes to lie above the print table. The gripper 11 is driven intermittently by conveyor chains 15 revolving clockwise in FIG 1. The conveyor chains 15 are equipped with four grippers 11, 12, 13 and 14 which are mounted at equal distances from one another on the conveyor chains 15, each one assuming the positions shown here one after the other when the chains 15 have moved further by one segment clockwise, corresponding to the distance between two successive grippers, i.e., between the grippers 11 and 12, for example. The gripper 11 has conveyed the print material 10 over the print table 3 in the position shown here. A carrier 16 made of an industrial cloth is provided between the gripper 11 and the gripper 12 downstream from the former in the direction of movement, said carrier being connected to the two grippers 11 and 12 and similarly also to the two other grippers 12 and 13 or 13 and 14 or 14 and 11. In the exemplary embodiment, each carrier 16 is connected to at least one of the grippers; in the exemplary embodiment shown here, each carrier is connected to the downstream gripper 12 by an elastic intermediate piece 17 which can compensate for differences in distance between the revolving grippers.

This novel screen printing machine is operated in such a way that the print material 10, which is fed by the gripper 11, is printed by the movement of the squeegee mechanism. It is therefore important for the carrier 16 to be air-permeable so that the applied vacuum of the print table 3 can act through the carrier on the print material 10. However, the material of the carrier 16 should also be antistatic so that there can be no static charge buildup during the conveyance and printing operations. The carrier material is also wear-resistant and UV-resistant because it must pass through the area of the dryer where UV radiation is used.

Once the print material 10 has been printed in FIG 1, the conveyor chain 15 continues to revolve clockwise by an amount corresponding to the distance between the grippers 11 and 12. Instead of the grippers 11, the gripper 12 is now in operation, this gripper first having gripped a new sheet of the print material in an essentially known manner and conveyed it over the print table. In this movement of the conveyor chain 15, the sheet of the print material 10 that has already been printed is conveyed by the gripper 11 beneath the squeegee mechanism 2 to the right out of the printing machine and into a position in which the print material can be dried. With each further movement of the conveyor chain 15, a new sheet for

printing is conveyed over the print table. The print material 10 with this novel screen printing machine always rests on the carrier 16 and thus never comes in contact with the print table (in the area to the left of the squeegee mechanism) or a substrate (with further conveyance out of the machine to the right). Therefore, damage to the back side of the print material is completely prevented.